The right optic nerve as large as the left but somewhat gray on its mesial side.

4. Brain of an idiot about 28 years of age who at the age of two had experienced an embolism of the left arteria fossæ Sylvii. On the left side the first temporal convolution is wanting and the ventral portion of the left parietal lobe, the medullary substance having especially suffered. Lateral ventricle much distended. Secondary atrophies; left pyramid very slender. The median nucleus of the thalamus opticus and the tuberculum anterius much diminished, while the pulvinar and the corpora geniculata externa corresponding with the fairly normal condition of the occipital lobe are almost as well developed as on the right side. The left corpus geniculatum externum has however almost completely disappeared. The corpora striata are normal on both sides. v. Monakow then expressly called attention to the fact that the intimate connections shown by him to exist between the various portions of the cortex and the inter and mid-brain were true not only for the rabbit, but also for the dog and man, being indicated by the secondary degenerations following cortical lesions. The dependence of the corpora geniculata externa on the cortex of the temporal lobe is for the first time described for man, but corresponds with observations previously made on both the rabbit and cat. The cases 1 and 3 also illustrate the necessary degenerations of the primary visual centres after the injury of the occipital lobes.

Ueber Befunde bie Erkrankung des Hinterhauptslappens. HOELE. Berliner Gesellschaft für Psychiatrie und Nervenkrankheiten. Sitzung vom Juli 8, 1889. Rev. in Neurolog. Centralbl. No. 14, 1889, by Hadlich.

The author presents observations of three cases in which there was disturbance of vision during life and the autopsy showed lesions in the occipital lobes, with which these symptoms were associated. At the same time the optic pathway from the cortex to the eye was more or less involved showing signs of atrophy. The results were presented as a contribution to the localization of vision in the occipital lobes.

Ueber die centralen Organen für das Sehen und das Hören bei den Wirbelthieren. HERMANN MUNK. Sitzungsber. d. Königl. Preuss. Akad, d. Wiss. zu Berlin. XXXI. 20 Juni, 1889.

This condensed account of Munk's views on some disputed points forms the fifth and closing paper of a series which commenced in 1883. In it he presents, besides his critical remarks, the main results of further work on dogs, monkeys and newborn rabbits.

In operating dogs and monkeys he recommended that the portion of the brain removed be cut out in one piece, one advantage of this method being that it enables the experimenter to see pretty accurately what the extent of the initial lesion is. The results are similar to those obtained by his previous procedure. These in the main have been corroborated by Sanger Brown and E. A. Schäfer and by Vitzou from the experimental side, while from the pathological side Nothnagel furnishes evidence for a similar relation of the cortex in man. Munk extends his results to the lower mammals, on the ground that though the visual centres are not well made out there, yet in rabbits,

guinea-pigs and rats, the removal of an entire hemisphere causes contralateral blindness. In discussing the results of Schrader on pigeons (see AMER. JOUR. PSYCHOL., vol. 2, p. 471) which are opposing—for Schrader claims that pigeons without the forebrain can still see—Munk urges as a chief objection that the cortical substance was not entirely removed, and if some remained it would account for what Schrader observed. Deciding against him, he concludes that the relation of the forebrain to vision is fundamentally different in the mammals and birds (?) to what it is in frogs and fish, and that the former without their forebrain are entirely blind. Further, that in the former the very sensation of light has its seat in the cortex, and that the optic or retinal reflex—the narrowing of the pupil when light is directed on the retina—does not require even the sensation of light for its performance, and cannot therefore be adduced as an argument.

The final portion of the paper is a criticism of Wundt's position on this question. Wundt argues that the (central) cortical elements are functionally indifferent, and the characteristic sensations which they give are due to molecular disturbances of a special sort dependent on the nature of the stimulus which has excited the nerve. In other words, if it were possible to connect one sensory nerve with the cortical centre of another sensory nerve, the sensation following a stimulation of the nerve would depend on the nerve stimulated, not on the centre with which it was connected. Such a view is based mainly on the apparent restitution of function after operations on the cortex, on the possibility of removing large parts of the hemisphere with only slight disturbance of function as a result. The other objection is the theoretical one that either the specific energy of the cortical cells was present from the earliest stages of development, which is highly improbable, or it has been gradually developed, in which case it is not strictly specific. In criticising the above, Munk points out that there is no good evidence for the notion that specific energy of the cortical cells depends on peculiar vibrations of the nerves to which they are attached, and that experiments on new-born animals, which should support this idea if any experiments would, are in fact opposed to it. As to the second objection, it might be urged against the physiological division of labor throughout the entire organism, and is not a special difficulty of the doctrine of the specific energy of nerves.

(The somewhat rigid form which Munk gives to his ideas on localization has always excited opposition because it is opposed to the gradation of function which is characteristic for living things. As regards the visual centres, he will have all mammals like the dogs and monkeys which he has operated; and yet for rabbits, guinea-pigs and rats he admits that the visual centres have not been defined, and for the last two bases his conclusions on those which have lost an *entire* hemisphere. In discussing v. Gudden's rabbit which had lost the posterior portions of both hemispheres, he states that undoubtedly that rabbit could see, but adds that other rabbits which in addition have had the cortex for some two mm. further cephalad removed were blind, and blames v. Gudden for his assumption that he had by his operation completely removed the visual centres. In the case of Schrader's pigeons, the objection is urged as one of great importance, that small portions of the cortex had been overlooked and were not removed. The above is prefatory to the question: what is the significance of the small portions of

cortex? The animals in question are not reported as seeing slightly with a small portion of the retina, but guide and control their motions with some skill. Either, then, their sight is better than the portion of cortex remaining would indicate, if the relations are the same as in dogs and monkeys, or a small portion of cortex comes to possess unusual powers as a visual center. Indeed, the attitude of Munk and Flourens with regard to the controlling value of a small part of the cortex is, when viewed in the light of the above experiments alone, by no means so different. Certain it is that the dependence of the centres in the spinal cord on the motor portions of the cortex decreases as we pass from man down the vertebrate series, and this fact suggests the possibility of a similar relation between the primary sensory centres and the cortical areas belonging to them. Such an idea would imply in the lower mammalia some power of the primary centres to act even after the cortex was destroyed. Against such a view Munk protests vigorously. But leaving this point one side for the time, it is most important that some demonstration of the value of residual portions of the cortex should be made, to determine whether the degeneration in the primary centres is quantitatively proportionate to the amount of cortex removed, or whether a small portion of cortex exercises a nutritional influence over these centres which is disproportionate to its size, or, whatever the relation may be, to give it some anatomical basis. REV.).

Ueber den Bau des Säugethiersgehirns. Vorläufige Mittheilung von DR. G. JELGERSMA in Meerenberg, Niederlande. Mit 1 Tafel, Morph. Jahrb., 1889, 15. Rev. in Neurolog. Centralbl., No 14., 1889, by P. Kronthal.

The author describes the intellectual tracts and centres of the medulla oblongata and cerebral axis. The course of the tracts is as follows. Starting from the cerebral cortex and passing through the internal capsule and the two lateral portions of the pes pedunculi, they unite in part with the nuclei of the pons on the same side and in part pass on to the ganglion cells of the nucleus olivaris. Both sets of fibers then cross with the corresponding ones on the other side. The crossed fibers from the nuclei of the pons pass through the brachium pontis, those from the nucleus olivaris through the corpus restiforme, the former going to the cortex of the cerebral hemispheres, and the latter probably to that of the vermis cerebelli. The cerebellar cortex is further connected with the nucleus dentatus. From this arises the superior peduncle of the cerebellum, which in turn, at the level of the corpora quadrigemina crosses with that of the other side, to unite with the nucleus ruber. From this nucleus fibers pass to the optic thalamus and the capsula interna, to finally end in the cortex.

The differences between man and the monkeys with regard to this entire tract are considerable: in man, the great development of the cerebellar hemispheres; in the monkey, the exposure of the corpus trapezoides on the cephalic side, absence of the neucleus arciformis, meagre development of the nucleus ruber, of the superior peduncle of the cerebellum, of the nucleus olivaris and the nucleus dentatus. The difference in the development of the intellectual tract seems to be as great as that of the surface of the brain. In comparing brains of different classes of animals, however, with reference to this tract,